

## HP TURBINE UPGRADE PROJECT

### Outstanding Issues

As we prepare to take advantage of the increased efficiency and output afforded by the HP Turbine upgrade there are several systems that require evaluation and possible modification. The most significant items identified to-date that require detailed assessment and potential upgrade within the foreseeable future are shown below with a first approximation cost estimate:

<u>Item</u>	<u>Estimate/Unit</u>
• Cooling Tower Performance Upgrade	\$4,000,000
• Main Steam Safety Valve Addition	\$ 150,000
• Cold Reheat Safety Valve Addition	\$ 150,000
• Generator Cooling Enhancement	\$ 100,000
• Generator Isophase Cooling Enhancement	\$ 50,000
• Large Motor Bus Loading Equalization	\$ 150,000
• ID Fan Intake Duct Design	\$ 100,000
• Boiler Feed Pump Performance Upgrade	\$ 150,000
• Main Step-up Transformer - current estimate (OEM conceptual comments due 1/12/01)	\$ 100,000

(Full load testing on PA and FD fans is recommended for establishing current baseline.)

As part of the HP turbine upgrade project, each of the items listed above will be analyzed in detail with specific regard to:

- Maximum Continuous Operating Capability
- Operating Efficiency
- Operating Redundancy
- Maintenance Impacts
- System and Unit Reliability
- Required Capital Improvements
- Economic Justification

These analyses have been underway since early December and will continue through mid 2001. Funds for these modifications have not yet been included in the upcoming 2001-02 budget.

In the event that staff chooses to minimize the required modifications, load and flow could be maintained at or near current levels through at least two conventional methods: increasing throttling losses or reducing throttle pressure. Turbine efficiency losses associated with increased throttling for the six (6) summer months of reduced load would be in the range of 1% of Turbine Heat Rate or approximately \$410,000 annually. Throttle pressure reduction associated with a load reduction of 10 percent would be in the range of 0.75% of Turbine Heat Rate or approximately \$310,000 annually. The largest economic penalty would come from potential lost revenue. Using present factors, one year of 10 MW additional output is worth approximately \$4,170,000.